The effect of reading aloud daily—Differential effects of reading to native-born German and Turkish-origin immigrant children

Oliver Klein [a,*], Nicole Biedinger [b], Birgit Becker [c,d]

[a] University of Mannheim, Mannheim Centre for European Social Research (MZES), D-68131 Mannheim, Germany
[b] GESIS Leibniz Institute for the Social Sciences, P.O. Box 12 21 55, 68072 Mannheim, Germany
[c] Goethe University Frankfurt and Center for Research on Individual Development and Adaptive Education of Children at Risk (IDeA), Frankfurt, Germany
[d] Goethe University Frankfurt, Faculty of Social Sciences, Campus Westend – PEG-Building, Grueneburgplatz 1, 60323 Frankfurt, Germany

ARTICLE INFO

ABSTRACT

Literature that examines possible heterogeneous effects of reading aloud to children of immigrants and children of native-born parents is scarce. The current study tries to address this scarcity by examining the effects of daily parent–child reading activities on the German vocabulary knowledge of children with ($n = 531$) and without migration background ($n = 499$) between the ages of three to five. Using propensity score matching (PSM), determinants of reading aloud daily to children are analyzed in the first step. Native parents are found to be more likely to read aloud daily to their children. Parents' education, cultural capital and a high frequency of engaging parenting practices also predict the frequency of parent–child reading. Factors specific to immigrant families are the age of migration and the primary family language. The effect of reading aloud on the vocabulary skills of children is the focus of the second part of the analysis. Positive effects are found among children of immigrants and children of native-born parents. However, this positive effect is reduced over time for native children. Overall, reading aloud daily is most effective among children of immigrant families, using the language of the host country as the primary family language, and among parents with good receiving country language skills.

© 2014 International Sociological Association Research Committee 28 on Social Stratification and Mobility. Published by Elsevier Ltd. All rights reserved.

1. Introduction

In the educational systems of most western countries, children of immigrants perform worse than native children (Heath & Brinbaum, 2007; Stanat & Christensen, 2006).

A major cause for the performance discrepancy are their less well-developed receiving country language skills compared to natives (Kristen et al., 2011). This disadvantage in host country language abilities already exists in early childhood even before children attend primary schools (Niklas, Schmiedeler, Prostler, & Schneider, 2011). Through processes of cumulative skill formation (Heckman, 2006) these early skill differences can lead to disadvantageous positions for children in their later lives, e.g., in their educational or occupational careers. One country in which we observe rather high performance discrepancies between children

* Corresponding author. Tel.: +49 621 181 2817; fax: +49 621 181 2803.
E-mail addresses: Oliver.Klein@mzes.uni-mannheim.de (O. Klein), nicole.biedinger@gesis.org (N. Biedinger), Bi.Becker@em.uni-frankfurt.de (B. Becker).

with and without an immigration background is Germany (Stanat & Christensen, 2006). Today, about one quarter of all fourth graders in Germany grow up in families with an immigration background (Kristen et al., 2011). Among children under the age of five the share already comprises about a third (Statistisches Bundesamt, 2012). Given this growing number of children from immigrant families in the German society, it is a pressing political and societal task to reduce ethnic educational discrepancies. Proper educational and occupational prospects among all groups of the society are not only essential to guarantee equal opportunities and good chances in the lives of all members of society but are also important on a societal level, e.g., considering the future economic potential of Germany. Thus, to enhance a smooth integration of children from families with an immigration background, it is crucial to examine conditions and activities that are likely to improve their receiving country language proficiency and promote their future life prospects.

Within the family context, engaging parent–child interactions in early childhood, such as reading aloud to children, telling stories, or playing, positively influence children's cognitive and language development (Crosnoe, Leventhal, Wirth, Pierce, & Pianta, 2010; Forget-Dubois et al., 2009; Melhuish et al., 2008; Raviv, Kessenich, & Morrison, 2004; Wood, 2002). In particular, researchers argue that reading aloud to children has a positive impact on their language abilities (Bus, Van Ijzendoorn, & Pellegrini, 1995; Debaryshe, 1995; Duursma, Augustyn, & Zuckerman, 2008; Ermisch, 2008; Evans, Shaw, & Bell, 2000; Leseman & van den Boom, 1999; Rush, 1999; Scarborough & Dobrich, 1994).

However, so far, literature on possible heterogeneous effects of reading aloud among native and immigrant children is scarce. The effectiveness of reading activities for the development of receiving country language skills (that are regularly demanded in the host countries educational systems) might differ between children of native-born parents and children of parents with an immigration background. In immigrant families parents do not necessarily read aloud in the host country's language but also in their mother tongue. Although this is likely to effectively enhance children's native language skills, host country specific language skills will arguably not be enhanced to the same amount (Scheele, Leseman, & Mayo, 2010). Moreover, immigrant parents might have difficulties with receiving country language skills themselves. This in turn can reduce the effectiveness of parent–child reading activities even if parents use the language of the host country when reading to their children. On the other side, reading in the host country's language could be particularly effective in immigrant families compared to native families, especially if children of immigrants lack receiving country language input in their general everyday environments (e.g., due to ethnically segregated neighborhoods or low levels of participation in kindergarten).

By taking the special situation of children of immigrants into account, the current study therefore deals with a rather underexplored issue concerning parent–child reading encounters: the possibility to enhance native and immigrant children's language skills early in life. In our analyses, we concentrate on Turkish-origin immigrant children in Germany who comprise the largest immigrant group in the country. We assess whether reading aloud frequently can diminish the language discrepancy between Turkish-origin and native German children. A further contribution of our study is that we do not restrict our analysis to the effects of reading aloud. So far, only few literature considers determinants of a high frequency of reading aloud and its effects on children's language abilities simultaneously (for an exception, see Raikes et al., 2006). However, certain family characteristics, such as socioeconomic status or cultural capital, will lead to more frequent parent–child reading activities and will also lead to better language skills of children. Thus, it is crucial to control for these factors when trying to assess the effectiveness of parent–child reading activities.

Our study assesses three major research questions. First we examine various parent and child characteristics to analyze which factors influence a high frequency of reading aloud among native and immigrant families. Second, we concentrate on the effect of parent–child reading activities on children's language skills, in specific their expressive vocabulary. We assess whether there are differential effects among children from native and immigrant families. Finally, we focus on immigrant families in more detail to examine whether the primary family language used in the families and the language skills of the parents affect the efficacy of parent–child reading activities.

2. Theoretical background

2.1. Determinants of reading aloud to children

To analyze the likelihood of frequent parent–child reading activities, we take an investment perspective. Becker and Tomes (1986) assume that parents invest in their children's human capital either by monetary investments (e.g., buying books or educational games) or by spending time on engaging parent–child activities (e.g., telling stories) (Aiyagari, Greenwood, & Seshadri, 2002; Conger & Dogan, 2007; Conger, Conger, & Martin, 2010; Esping-Andersen & Bonke, 2007; Mistry, Biesanz, Chien, Howes, & Benner, 2008; Yeung, Linver, & Brooks-Gunn, 2002). Within this family investment framework it is further assumed that families with a high socio-economic status (SES) invest more in stimulating parental activities with their children than parents in low SES families. It is argued, that the latter are more concerned with investments in immediate family needs (Conger & Dogan, 2007; Conger et al., 2010).

A number of studies have emphasized parents' socioeconomic status as an important predictor that influences the frequency of parent–child reading activities (Karrass, VanDeventer, & Braungart-Rieker, 2003; Scarborough & Dobrich, 1994; Sonnenschein & Munsterman, 2002). Although, findings on family income are not clear-cut (Karrass et al., 2003; Kitterod, 2002; Yarosz & Barnett, 2001; Zick, Bryant, & Osterbacka, 2001), it is rather well documented, that highly educated parents read more frequently to their children than less educated parents (Craig, 2006; Kitterod, 2002; Yarosz & Barnett, 2001; Yeung, Sandberg, Davis-Kean, & Hofferth, 2001). In addition to the

socioeconomic status, cultural capital, e.g., parents' general reading behavior or the number of books in the household, correlates positively with the frequency of reading aloud to children (Bus et al., 1995; Scarborough & Dobrich, 1994). Moreover, parents who engage frequently in cultural activities, such as visiting museums or theaters, participate more often in joint activities with their children (Klein & Biedinger, 2009). Furthermore, studies show that an engaging parenting style generally increases the frequency of reading to children (Bus et al., 1995; Karrass et al., 2003). In line with these finding, we hypothesize that the educational resources in the families (indicated, e.g., by SES and cultural capital) have a positive impact on the frequency of reading aloud both in immigrant and native families (hypothesis 1).

Another important correlate of reading activities of particular interest for this study is the ethnic and immigration background of families. A number of studies find native parents to read more frequently to their children than immigrant or ethnic minority parents (Leseman & van den Boom, 1999; Raikes et al., 2006; Yarosz & Barnett, 2001). Several recent German studies find that Turkish-origin parents are less engaged than native German parents in this respect (Jäkel, Schölmerich, Kassis, & Leyendecker, 2011; Leyendecker, Jäkel, Kademoglu, & Yagmurlu, 2010; Niklas & Schneider, 2010). In line with these findings we argue that immigrant parents read less often to their children than natives (hypothesis 2). Moreover, the primary family language is also correlated with the frequency of reading aloud. Ethnic minority parents whose primary family language is not the language of the receiving country seem to read rarely to their children (Yarosz & Barnett, 2001). Derived from this, our third hypothesis is that, immigrant families using the host country's language as family language are more likely to read frequently.

Previous research also shows that a number of parent and child characteristics as well as family structure correlate with the frequency of reading aloud. We therefore control for a number of other factors, e.g., the employment status of the primary caregiver, whether the child grows up in a single parent household, and the number of children.

2.2. Effects of reading to children on their language skills

It is widely acknowledged that the development of children depends on various stimulating interactions with their environments. We refer to Bronfenbrenner's bioecological theory of human development as our major theoretical framework concerning the developmental effects of these stimulating interactions (Bronfenbrenner, 1976, 1977). According to Bronfenbrenner (1997), the ecological environment consists of various nested structures that interact with each other. In our study, we concentrate on the innermost of these structures, namely the microsystems. One particularly important microsystem for the development of young children is the family (Bronfenbrenner, 1986). Regular, enduring interactions, so called "proximal processes", (e.g., parent–child activities) "produce and sustain development" (Bronfenbrenner, 1997, p. 39). However, the efficiency of those proximal processes depends on various characteristics of the persons

involved, the environment in which they take place and the specific outcome that is considered (Bronfenbrenner, 1997). This idea is also reflected in the environmental specificity hypothesis (Wachs & Chan, 1986). It assumes that different environmental facets affect specific aspects of child development. For instance, activities with a high amount of language input are considered to specifically increase early language and literacy skills of young children (Debaryshe, 1995; Evans et al., 2000; Leseman & van den Boom, 1999; Rush, 1999; Shapiro, Anderson, & Anderson, 1997). Drawing on these theoretical considerations, we regard reading aloud frequently as one specific proximal process that takes place in the family and enhances language skills of young children.

A number of mechanisms are supposed to explain how reading aloud in particular enhances children's language skills. First, it is argued that during parent–child reading children encounter a variety of words that are typically not used in everyday language. Thus, reading aloud frequently helps children to develop a sophisticated vocabulary (Duursma et al., 2008; Leseman, Scheele, Mayo, & Messer, 2007; Mol & Bus, 2011; Sénéchal, LeFevre, Thomas, & Daley, 1998). Second, it is assumed that by listening to stories children's listening comprehension and their knowledge about story structures are enhanced (Duursma et al., 2008; Leseman et al., 2007; Mol & Bus, 2011; Sénéchal et al., 1998; Zuckerman & Khandekar, 2010). Third, reading aloud is considered a type of print exposure. Thus, other aspects of early literacy skills, e.g., print concepts and letter knowledge, may be supported by reading storybooks to children (Duursma et al., 2008).

Besides these specific explanatory approaches, many studies use the broader concept of the home literacy environment (HLE). So far, there is no clear-cut definition of the concept and various studies differ to some degree in its operationalization (Niklas & Schneider, 2010). It typically contains a set of factors that are related to children's early literacy experiences in the family and are thought to foster their language development (Burgess, Hecht, & Lonigan, 2002; Leseman et al., 2007; Manolitsis, Georgiou, & Tziraki, 2013; Niklas & Schneider, 2010). Sénéchal and colleagues further developed a detailed framework that links early literacy experiences to language and literacy skills of children (Sénéchal & LeFevre, 2002; Sénéchal et al., 1998). They distinguish formal and informal parent–child literacy activities. Reading to children is considered an informal literacy activity and is shown to influence children's vocabulary knowledge positively. Further studies support this framework (Hood, Conlon, & Andrews, 2008; Kim, 2009; Sénéchal, 2006). However, the majority of those studies uses rather small (*n* < 125) and, regarding the socioeconomic status of the family, selective samples (for an overview, see Mol & Bus, 2011). Moreover, they mostly use few control variables.

Other studies analyzing the particular effect of reading aloud draw on larger and mixed samples, and control for various family background characteristics (e.g., Kloosterman, Notten, Tolsma, & Kraaykamp, 2011; Raikes et al., 2006). In their longitudinal study, Raikes et al. (2006) analyze, among other things, the effect of book reading on the receptive and comprehensive vocabulary of 14–36

month-old children from low-income families. After controlling for background characteristics of the mother and the child, they find that reading daily or several times a week positively affects the expressive and comprehensive vocabulary of 14 and 24 month-old children. However, receptive vocabulary at 36 months is only increased by daily reading over three consecutive assessments at 14, 24, and 36 months. Kloosterman et al. (2011) examine the effects of parental reading socialization on the school performance (including a language ability test) of over 10,000 Dutch children aged five through twelve years from various social backgrounds. In their panel study, they find a positive effect of a high frequency of reading aloud to children at the age of five to six on their language abilities throughout primary school. These advantages remain even after controlling for various background characteristics of the families (e.g., parental education, income and reading habits, child's gender).

In our current study, we focus on the frequency of reading aloud. In line with theory (Bronfenbrenner, 1997) and former research (Kloosterman et al., 2011; Raikes et al., 2006; Sénéchal & LeFevre, 2002; Sénéchal et al., 1998), we assume positive effects of a high frequency of reading aloud on the vocabulary knowledge of both immigrant and native children (hypothesis 4).

2.3. Differential effects of reading aloud to children of immigrants and native children

In line with Bronfenbrenner's bio-ecological theory of human development, we expect heterogeneous effects of reading aloud on the language skills of children of immigrants and children of native born parents. According to Bronfenbrenner, the efficiency of proximal processes varies with aspects of the microsystems and with specific developmental outcomes (Bronfenbrenner, 1997). The microsystem of native and immigrant families most likely differs in various cultural aspects. One specifically interesting aspect for our study is the family language. In immigrant families, the language of the receiving country is not necessarily the primary family language. Hence, parents with an immigration background do not necessarily use the host country's language while reading to their children. They may read in their native language as well, which probably fosters general cognitive development and native language skills. However, it may not foster the acquisition of the receiving country's language to the same amount as using the host country's language (Scheele et al., 2010). Additionally, parents with a migration background might encounter difficulties with the language of the host country themselves. This may make parent–child reading activities less effective in fostering children's host country's language (Becker, 2010).

Studies on differential effects of reading aloud or a rich home literacy environment in immigrant and native families are scarce. The few studies that exist draw on rather small or selective samples concerning the SES of participating families. In the US, Mistry et al. (2008) focus on low-income children from native ($n = 1202$) and immigrant ($n = 257$) households. Most of the immigrant families in their study are Latin American families (79 percent).

They find that children from immigrant families experience lower levels of language and literacy stimulation than children from native born US parents. Nevertheless, they show that a rich home literacy environment positively influences the cognitive abilities and the English vocabulary knowledge (measured as a single composite score) of preschool aged children independent of their immigration background. Two studies from the Netherlands report conflicting findings. Leseman and van den Boom (1999) examine the effects of the quantity and quality of proximal processes (e.g., literacy, communicative and problem solving interactions) on a composite score of cognitive and language skills among a sample of 3–4-year old children from Dutch middle-class ($n = 44$) and Dutch lower-class ($n = 31$) families, as well as Surinamese ($n = 27$) and Turkish ($n = 28$) immigrant families. In their one year longitudinal study they find positive effects of a high frequency of proximal processes on the cognitive and language skills of children with Turkish-origin parents but not for native Dutch or Surinamese-Dutch children. In contrast, Scheele et al. (2010) focus on the effects of the home language environment on the vocabulary knowledge of children at the age of three. Their study includes native Dutch ($n = 58$), immigrant Moroccan-Dutch ($n = 46$) and Turkish-Dutch ($n = 55$) children. Results show that reading aloud fosters the vocabulary knowledge of native Dutch children. However, Scheele and colleagues do not find significant correlations between the reading frequency in Turkish-Dutch or Moroccan-Dutch immigrant families and the vocabulary skills of their children. Moreover, they show that reading aloud in the native language of families with an immigration background does not foster host country's language skills of children directly (Scheele et al., 2010). There are also mixed findings for Germany concerning heterogeneous effects of reading aloud to native German children and children of Turkish-origin parents. Caspar and Leyendecker (2011) analyze a sample of 95 children of native-born German parents and 88 children from families with a Turkish immigration background at the age of four to five years. Concentrating on German language abilities, they do not find any positive effect of reading aloud in their multivariate analyses in either group. In another study, Jäkel et al. (2011) use a comparable sample of 88 children from native German families and 79 children with a Turkish immigration background. In their primary analysis they do find a significant positive effect of a stimulating HLE (including parent–child reading activities) on the language abilities of children without an immigration background but no effect for children with a Turkish immigrant background. In a subsequent analysis they match both groups on parental education and analyze a subsample of 51 native German and 34 immigrant Turkish families. In these final analyses they find significant positive effects of a rich HLE on the language abilities in both groups.

Taken together, the results are rather ambiguous, allowing no clear conclusions. The different findings across the studies might be due to differences in the operationalization in both, the major independent variables (various conceptualizations of HLE or proximal processes versus the frequency of reading aloud) as well as the outcome

variables (a composite score of cognitive and language abilities versus exclusive language ability tests).

Derived from theoretical expectations (Bronfenbrenner, 1997) we argue that a high frequency of reading aloud is more effective among native German families compared to families with a Turkish immigration background (hypothesis 5). Furthermore, we argue that the effect of reading aloud on German language abilities is larger in Turkish immigrant families using German as the major family language and among Turkish immigrant parents with good German language skills compared to families that use Turkish as their primary family language and among parents with lower German language skills (hypothesis 6).

3. Data, variables and method

3.1. Data

In the empirical analyses, we use data of the Project "Preschool Education and Educational Careers among Migrant Children" which is carried out at the Mannheim Centre for European Social Research at the University of Mannheim (Germany). The project is funded by the German Research Foundation (DFG). We selected German and Turkish-origin families with a three to four year-old child randomly from resident-registration offices in 30 cities and communities of a local region in South-West Germany. All families with at least one parent or grandparent of the child born in Turkey are considered as having a Turkish immigration background. We use this rather broad definition of immigrant background because research finds that in Germany, even third-generation immigrant children have lower language skills at preschool age than native children (Becker, 2011). A computer-assisted personal interview (CAPI) was conducted with the child's primary caregiver. The interview comprised questions concerning the child's family activities, preschool attendance, the social and cultural capital of the parents, demography of the family members, as well as specific questions concerning the migration history and background of immigrant families. After the interview, the standardized developmental test "Kaufman Assessment Battery for Children" (K-ABC) was conducted with the child (German version, see Melchers & Preuß, 2001). The test includes the subtest "expressive vocabulary" which is a direct adaptation of the "picture vocabulary" subtest of the Stanford-BINET. Because the interviewers were bilingual, it was possible to administer both the interview and the K-ABC instructions in either German or Turkish, depending on the preferred language of the families. The project is designed as a panel study. We use data from the first and second wave. Overall, 1283 families participated in the first wave in 2007. In 2008, the second wave was conducted. Panel attrition was about 8 percent resulting in a total number of 1177 families in the second wave. After excluding all families with an immigration background other than Turkish and deleting cases with missing values on variables included in the statistical models listwise, 1030 families, including 499 native German families (48.4 percent) and 531 Turkish immigrant families (51.6 percent), remain for our analysis of the first wave. In the second wave, 997 families remain.

These consist of 501 native German families (50.2 percent) and 496 families with a Turkish immigration background (49.8 percent).

3.2. Measures of vocabulary knowledge and frequency of reading aloud

3.2.1. Vocabulary knowledge (dependent variable)

The German vocabulary knowledge of children is operationalized by the results of the K-ABC subtest "expressive vocabulary". The test consists of 24 tasks. Each correct answer gains one point. Although, test instructions could be given in Turkish, all children had to provide the answers in German. In our analyses, we use the raw sum score of the answers as the dependent variable.

3.2.2. Reading aloud daily

Parents were asked how often they read aloud to their children. The answer categories range from 0 (never) to 6 (daily). We generate two separate dummy variables. The first one is coded 1 if parents read to their children daily and 0 otherwise. Thus, when using this variable in later analyses, the control group consists of all families that read less than daily to their children ("complete" control group). The second dummy variable limits our sample to families that either read aloud daily (1) or several times a week (0). We use this second dummy variable to estimate the most conservative effect of reading aloud daily in later analyses ("conservative" control group).

3.3. Factors influencing the frequency of reading aloud

3.3.1. Immigration background/generational status

We consider children to have an immigration background if they have at least one parent or grandparent born in Turkey. We further employ four dummy variables representing children's generational status. The first dummy variable represents children of the second generation (2nd generation) whose parents were both born in Turkey and migrated to Germany. The second dummy variable represents children with one parent born in Turkey and one second-generation parent born in Germany (2.5 generation). The third category includes children of parents who are both second-generation immigrants (3rd generation). Finally, one dummy variable comprises children of one parent with a Turkish migration background and one native German parent (intermarriages). In addition to the generational status of the child, we control for the age at migration of both parents. Only four children with a Turkish migration background were not born in Germany. However, these children arrived in Germany before the age of two.

3.3.2. German language abilities of the parents

Immigrant parents were asked to assess how well they could read and speak German. Answers range from 1 (not at all) to 5 (very good). We use the mean score of both parents to create a dummy variable taking the value of 1 if the mean of both abilities is at least "good" and 0 otherwise. A value of 1 is assigned to all native German parents.

3.3.3. Primary family language

In immigrant families, the parents' frequency of talking to their children in German was assessed. Answer categories range between 1 (never) and 5 (always). Again we use the mean of both parents to create a dummy variable taking the value of 1 if German was spoken most of the time and 0 otherwise. All native families are set to 1.

3.3.4. Parental education

Parents' education and their vocational training level are operationalized using the International Standard Classification of Education (ISCED-97). We classify the original schema into three categories (see Ehmke & Siegle, 2005). The lowest category consists of parents with a primary or a lower secondary school education (ISCED-categories: 1 and 2). The intermediate category contains parents with an intermediate or high secondary school education and/or vocational training (ISCED-categories: 3a, 3b, and 4). Parents with a tertiary education are in the third category (ISCED-categories: 5a and 5b).

3.3.5. Income

In addition to the educational level of the parents, we use the logarithm of the net income, including all general government transfers. We further use a dummy variable to control for missing values.

3.3.6. Parents' cultural capital

We use two variables to assess parents' cultural capital. First, we control the number of books in the household. We use the logarithm of the total number of books in the family (open question in the parent interview) in our analyses because we do not assume a linear effect of the number of books.

Second, we assessed the frequency of five leisure time activities of parents (reading books; reading newspapers; using the Internet or checking emails; participating in music or art activities; and visiting the opera, a museum, or a theater) to create a sum index of cultural activities ranging from 1 to 6.

3.3.7. Engaging parenting practices

A sum index of the frequency of parents participating in various parent–child activities is used to represent the amount of engaging parenting practices. The answer categories of all variables range from 1 (never) to 7 (daily). The activities include telling stories, singing songs, playing board or card games, and doing puzzles.

3.3.8. Further control variables

In addition, we control for a number of further parent, child and family characteristics, including the employment status of the primary caregiver, the sex and age of the child, whether the child is the firstborn, and how long the child already attended kindergarten. We also control for the number of children in the family, whether it is a single parent household, and whether the parents are aware of any chronic illness of the child.

4. Analyses

4.1. Modeling strategy

We use propensity score matching (PSM) to estimate the effect of reading aloud on the vocabulary knowledge of children. This method is closely oriented on the counterfactual framework of causality (Gangl & DiPrete, 2006; Gangl, 2010a; Holland, 1986; Rubin, 1974, 1978; Winship & Morgan, 1999). Because we are interested in the specific effect of reading aloud on language abilities, this framework perfectly fits our research aim.

In a randomized experiment, analyzing the effect of a treatment (reading aloud daily) would be a minor problem since children were randomly assigned to the treatment group (parents who read aloud daily) and to the control group (parents that read aloud less often). A mean comparison of the two groups would provide the effect of reading aloud daily. However, when working with survey data, participants are in general not randomly assigned to the treatment condition, but instead select themselves into the treatment due to various background characteristics.

When using PSM, we take this into account in a first step of the analysis. A probit regression is used to estimate the probability (propensity score) of children to encounter daily parent–child reading. The regression should include all factors that impact the treatment condition as well as the outcome of interest (Gangl, 2010a; Winship & Morgan, 1999). In our analysis, these covariates are the factors that influence (i) whether parents read to their children daily, and (ii) the language abilities of children. They are represented by the variables we discuss in Sections 2.1 and 3.3, e.g., parental educational level, immigration background, and cultural capital. Children that do not differ in any of these background characteristics, but in whether their parents read to them daily or not, are matched. Using the one-dimensional propensity score instead of the single covariates to match participants to their counterfactual observations is sufficient and especially useful in smaller samples (Morgan & Harding, 2006; Rosenbaum & Rubin, 1983). After the matching procedure, children in the treatment and control group do not differ in any background characteristic but only in whether their parents read to them daily or not. Thus, a mean comparison in this matched sample yields the results for the specific effect of reading aloud. In all analyses, we use the Stata ado "psmatch2" by Leuven and Sianesi (2003). As a matching procedure, we choose Gaussian Kernel Matching with common support to guarantee that we consider only children with comparable counterfactual observations.

We will start our analyses with the estimation of the propensity score of the study participants.[1] This yields insights into determinants of daily parent–child reading activities among native families and families with an immigration background. Hereafter, we match children of parents that read aloud daily to their counterfactuals

---

[1] Descriptive statistics are additionally provided in the appendix, Tables A1 and A2.

Table 1
Predictors of reading aloud daily by migration background.

	Native German families		Turkish-origin families		Combined sample	
	Coef.	Std. error	Coef.	Std. error	Coef.	Std. error
Interm. education (ref. low)	0.068	(0.251)	0.033	(0.187)	0.041	(0.139)
High education (ref. low)	0.147	(0.293)	0.667	(0.260)*	0.290	(0.174)+
Income (log.)	0.166	(0.171)	0.106	(0.183)	0.204	(0.117)+
Income (missing)	0.113	(0.258)	−0.031	(0.213)	−0.029	(0.150)
Employment primary caregiver (ref. no)	−0.013	(0.147)	0.022	(0.184)	−0.032	(0.112)
Number of books (log.)	0.146	(0.057)*	0.157	(0.064)*	0.148	(0.040)***
Cultural activities	0.189	(0.097)+	0.010	(0.101)	0.116	(0.067)+
Engaging parenting practices	0.140	(0.075)+	0.290	(0.074)***	0.222	(0.050)***
Turkish migration background	–	–	–	–	−1.141	(0.115)***
2.5th gen. (ref. 2nd gen.)	–	–	−0.237	(0.196)	–	–
3rd gen. (ref. 2nd gen.)	–	–	−0.102	(0.371)	–	–
Intermarriage (ref. 2nd gen.)	–	–	−0.395	(0.335)	–	–
Age at migration	–	–	−0.009	(0.010)	–	–
Age at migration partner	–	–	−0.017	(0.009)+	–	–
Primary fam. lang. (ref. Turkish)	–	–	0.550	(0.188)**	–	–
German language skills (ref. low)	–	–	−0.136	(0.176)	–	–
Two-parent family (ref. single parent)	0.167	(0.287)	−0.855	(0.588)	−0.109	(0.246)
Sex of child (ref. male)	0.100	(0.139)	−0.054	(0.150)	0.019	(0.098)
Age of child (in months)	0.037	(0.022)+	0.032	(0.021)	0.031	(0.015)*
Firstborn (ref. no)	0.326	(0.175)+	0.159	(0.192)	0.161	(0.124)
Kindergarten (in months)	−0.007	(0.014)	−0.013	(0.014)	−0.007	(0.009)
Number of children	−0.024	(0.105)	−0.162	(0.107)	−0.131	(0.070)+
Mother is primary caregiver (ref. no)	0.278	(0.370)	0.079	(0.318)	0.146	(0.233)
Chronic illness (ref. no)	−0.196	(0.205)	0.010	(0.247)	0.076	(0.156)
Intercept	−4.823	(1.586)**	−3.746	(1.749)*	−4.546	(1.153)***
N	499		531		1030	
Pseudo R^2_{MF}	0.122		0.182		0.370	

Source: Project "Preschool Education and Educational Careers among Migrant Children", own calculations.

Note: Unstandardized coefficients from probit regression with standard errors in parentheses.

+ $p \leq 0.10$.
* $p \leq 0.05$.
** $p \leq 0.01$.
*** $p \leq 0.001$.

to arrive at matched samples. After examining whether the matching procedure was successful, we analyze the immediate effect of reading aloud daily on the vocabulary knowledge of native German children and children from families with a Turkish immigration background at the time of the first interview, and the lasting effect of reading aloud one year later at the time of the second interview.[2] In a final step, we concentrate on the Turkish-origin sample to assess whether the effect of reading aloud differs in immigrant families with German as their primary family language and among parents with a good command of German compared to families where German is not the primary family language and where parents have lower German language skills.

4.2. Procedure and results of the propensity score matching

To estimate the propensity scores in our samples of native German and Turkish-origin families, we use separate

probit regression models (see Table 1). Among native German families, none of the classic SES indicators considered in our analysis, namely education and family income, show a significant effect on the probability of daily parent–child reading activities. However, cultural aspects such as participating frequently in cultural activities and owning a large number of books increase the likelihood of parents reading to their children daily. Moreover, a high frequency of engaging parenting practices, the age of the child, and whether the child is the firstborn predict the probability of daily parent–child reading activities. The pseudo R-squared in the sample of native German families is 0.12.

Among families with a Turkish immigration background, we find that highly educated parents read to their children more frequently. Similar to the German sample the number of books as well as engaging parenting practices increase the likelihood of daily reading activities of parents and their children. However, we do not find that cultural activities of the parents predict parent–child reading habits. Moreover, there are also some important predictors that are specific for families with an immigration background. The age at migration of the primary caregiver's partner is negatively related to the probability of reading to children daily. Immigrant families that use the language of the host country as their primary family language are

---

[2] Please note that in the analyses on the lasting effects of reading aloud, only the dependent variable (vocabulary knowledge) is taken from the second wave. The treatment variable (reading aloud) and the control variables used to estimate the propensity score remain from the first wave.

Table 2
Effects of reading aloud frequently on vocabulary knowledge, native German children.

Sample (control group)	Unmatched sample		Matched sample		N
	Coef.	Std. error	Coef.	Std. error	
Native German wave 1 (complete)	1.219***	(0.278)	0.872**	(0.312)[a]	499
Native German wave 1 (conservative)	0.810**	(0.301)	0.774*	(0.337)[a]	473
Native German wave 2 (complete)	0.881**	(0.301)	0.700+	(0.415)[a]	501
Native German wave 2 (conservative)	0.779*	(0.328)	0.523	(0.435)[a]	478

Source: Project "Preschool Education and Educational Careers among Migrant Children", own calculations.
Note: Mean difference of the K-ABC expressive vocabulary test score in the unmatched and matched sample. The "complete" control group consists of all children whom were read to less often than daily. The "conservative" control group consists only of children whom were read to several times a week.

[a] Standard errors in the matched sample result from bootstrapping with 500 repetitions.
+ $p \leq 0.10$.
* $p \leq 0.05$.
** $p \leq 0.01$.
*** $p \leq 0.001$.

in contrast more likely to read to their children on a daily basis. The pseudo *R*-squared is 0.18.[3]

Finally, we combine the native German and Turkish-origin samples to analyze whether immigrant parents read less often to their children than native German families. We find a highly significant negative correlation between the Turkish immigration background and the probability of daily parent–child reading activities.

After estimating the propensity scores in the samples of native German and Turkish immigrant families, we match participants on these. The mean standardized bias between the treatment and control group is reduced largely after matching in all samples and ranges from 2.61 to 4.82 (see Table A3). Therefore we consider the matching procedure successful.[4]

4.3. Effects of reading aloud daily

4.3.1. Native German families

First, we investigate the immediate effect of reading aloud daily on the vocabulary knowledge of children from native German families in the first wave (Table 2, first row). A *t*-test in the unmatched sample between children of parents who read to them daily and those of parents who read fewer times indicates a highly significant positive effect of reading aloud daily on the vocabulary knowledge of children. Children who experience daily reading activities with their parents score 1.22 points higher on the K-ABC expressive vocabulary test. When controlling for covariates of reading aloud in the matched sample, the effect is reduced, yet significant. Reading aloud daily gains 0.87 points on the expressive vocabulary test.

However, the control group in this analysis includes, e.g., families in which parents never read to their children and families in which parents read aloud several times a week. We take this into account in the second analysis by reducing the control group to children of native German parents who read to them several times a week (Table 2, second row). The results of this analysis represent the most conservative effect of reading aloud daily because we compare daily parent–child reading activities with reading aloud several times a week. Results show a similar pattern as in the first analysis though less pronounced. The effect of reading aloud daily (0.81) is overestimated in the unmatched sample. In the matched sample, it is reduced to 0.77. Even this most conservative effect of reading aloud daily is nevertheless significant.

To analyze whether the effect of reading aloud daily on the vocabulary knowledge persists over time, we use the vocabulary knowledge of children in the second wave as dependent variable (Table 2, third row). Again, the pattern of overestimated effect sizes in the unmatched sample is apparent. In the matched sample, daily reading has an effect of 0.7 points and is only significant at the 10 percent level. Thus, the positive effect of reading aloud daily weakens but lasts at least for one year. However, the most conservative effect of reading aloud daily does not persist over one year (Table 2, fourth row). Using the restricted control group, our analysis shows that the advantage children gain from daily parent–child reading compared to reading several times a week is insignificant.

4.3.2. Turkish-origin families

The familiar pattern of overestimation in the unmatched sample also shows up and is more pronounced in all analyses of children with a Turkish immigration background (Table 3). This indicates that other family characteristics also influence children's language skills, e.g., the primary family language. If these factors are not controlled in the analyses, the effects of reading aloud are overestimated. Looking at the matched sample, the effect of reading aloud daily among children of Turkish immigrant parents is 1.13 points and significant at the 10 percent level. This is larger compared to native German families. However, using the restricted control group of children whose parents read aloud several times a week, the effect is reduced to 0.62 points and insignificant. This conservative estimate is smaller compared to the conservative estimate among

---

[3] We report only findings for the samples we used for analyses of the first wave. The results only differ negligibly when estimating the propensity score for participants of the second wave.

[4] According to Caliendo and Kopeinig (2008) the matching procedure can be considered successful if the mean standardized bias is below 5. As supposed by Caliendo and Kopeinig (2008), we also analyzed whether the treatment and the control group differ significantly in any covariates we consider in the estimation of the propensity score, after matching. This is not the case.

Table 3

Effects of reading aloud frequently on vocabulary knowledge, Turkish-origin children.

Sample (control group)	Unmatched sample		Matched sample		N
	Coef.	Std. error	Coef.	Std. error	
Turkish-origin wave 1 (complete)	2.985***	(0.495)	1.131+	(0.584)a	531
Turkish-origin wave 1 (conservative)	1.852**	(0.650)	0.621	(0.780)a	250
Turkish-origin wave 2 (complete)	3.239***	(0.616)	1.264+	(0.745)a	496
Turkish-origin wave 2 (conservative)	2.051**	(0.695)	0.565	(0.877)a	232

Source: Project "Preschool Education and Educational Careers among Migrant Children", own calculations.

Note: Mean difference of the K-ABC expressive vocabulary test score in the unmatched and matched sample. The "complete" control group consists of all children whom were read to less often than daily. The "conservative" control group consists only of children whom were read to several times a week.

ᵃ Standard errors in the matched sample result from bootstrapping with 500 repetitions.
+ $p \leq 0.10$.
* $p \leq 0.05$.
** $p \leq 0.01$.
*** $p \leq 0.001$.

Table 4

Conditional effects of reading aloud frequently on vocabulary knowledge, Turkish-origin children.

	Wave 1 (complete)		Wave 1 (cons.)		Wave 2 (complete)		Wave 2 (cons.)	
	Model 1a Coef. (S.E.)	Model 1b Coef. (S.E.)	Model 2a Coef. (S.E.)	Model 2b Coef. (S.E.)	Model 3a Coef. (S.E.)	Model 3b Coef. (S.E.)	Model 4a Coef. (S.E.)	Model 4b Coef. (S.E.)
Family language (ref. Turkish)	2.45* (1.09)	0.63 (1.17)	3.66** (1.13)	1.71 (1.22)	1.98+ (1.09)	0.41 (1.22)	2.74* (1.16)	1.16 (1.29)
German ability (ref. low)		3.92*** (1.17)		4.08*** (1.23)		3.14* (1.21)		3.23* (1.30)
Intercept	0.20 (0.67)	−1.54+ (0.82)	−0.81 (0.71)	−2.58** (0.85)	0.48 (0.69)	−0.80 (0.83)	−0.53 (0.73)	−1.88* (0.89)
N	87	87	87	87	81	81	80	80
R² (adj.)	0.04	0.15	0.10	0.20	0.03	0.09	0.06	0.11

Source: Project "Preschool Education and Educational Careers among Migrant Children", own calculations.

Note: Unstandardized coefficients from OLS-regression with standard errors in parentheses. The "complete" control group consists of all children whom were read to less often than daily. The "conservative" control group consists only of children whom were read to several times a week.

+ $p \leq 0.10$.
* $p \leq 0.05$.
** $p \leq 0.01$.
*** $p \leq 0.001$.

native German children. Thus, daily parent–child reading seems less effective among immigrant families.

The effect of reading aloud daily among Turkish immigrant children persists and even increases slightly when considering the complete control group. Children who encountered daily parent–child reading score 1.26 points higher on the vocabulary test after one year. This contradicts our findings among native German families. However, when using the restricted control group, the effect is not significant which is similar to native German children.

4.3.3. Turkish-origin families with German as primary family language and good German language skills

In our final step of the analyses, we focus on families with a Turkish migration background in more detail (Table 4). We examine whether the effect of reading aloud is affected by the primary family language and by the German language skills of the parents. Due to the small number of observations in this subsample of Turkish immigrant families who read aloud daily, it is not possible to use propensity score matching. Instead, we use nested regression models and regress the effect of reading aloud daily

in the matched sample of Turkish-origin families on the primary family language and the parents' German language abilities.[5]

Table 4 shows that the immediate effect of reading aloud daily is significantly higher in families that use German as their primary family language (Model 1a). However, the positive effect of using German as family language disappears after controlling for the German language skills of parents (Model 1b). According to this, it is rather the parents' German language skills that matter for the effectiveness of parent–child reading.[6] Comparing the effect of

---

[5] In this restricted analysis of Turkish-origin families who read aloud daily the dependent variable is the effect of reading aloud that was estimated in the Turkish-origin sample (compare Section 4.3.2). These conditional effects should be interpreted with care and are used to obtain an explorative look at the importance of German as the primary family language and the German language skills of parents. See Gangl (2010b) for a discussion regarding the limitations of this methodological approach.

[6] Please note that the measures used for the primary family language and the German language abilities correlate quite high with .64. However, given the variance inflation factors of 1.28 we do not seem to have any problems with multicolliniarity.

reading aloud in Turkish-origin families with parents that speak German well to native German families (see Table 2) the former is significantly higher (3.01 vs. 0.87).[7] Using the conservative control group, we find similar results (Models 2a and 2b). Again, when comparing it to native German families, we find substantial and significant differences (3.21 vs. 0.77). The same picture arises when looking at the persistent effect of reading aloud, irrespective of using the complete (Models 3a and 3b) or the conservative control group (Models 4a and 4b).

These results indicate that reading aloud daily is most effective among Turkish immigrant families in which parents have good German language skills.

5. Discussion

Parents are regularly encouraged to read to their children frequently. It is argued that, besides being an enjoyable parent–child activity, reading aloud fosters language skills of children. However, scientific research mostly finds moderate effects of reading aloud in early childhood (Bus et al., 1995; Mol & Bus, 2011).

In our study, we focused on different effects of reading aloud in families with and without an immigration background. We first analyzed determinants of parent–child reading activities. Afterwards, we examined the effect of reading aloud among native German and Turkish-origin families. In our final analysis, we focused on Turkish immigrant families to assess whether reading aloud is more effective in immigrant families that use German as their primary family language and among parents who possess good German language skills.

Our results on the frequency of reading aloud mainly support findings from previous research and the family investment model (Conger & Dogan, 2007). We find native parents to be more likely to read to their children daily (hypothesis 2). In both, families with and without an immigration background, engaging parenting practices and a high number of books predict the probability of parents reading to their children daily (hypothesis 1). However, there also exist some differences in the two samples. We do not find that parents' education, a classic SES indicator, predicts parent–child reading among native German families. However, cultural capital, measured as the frequency of parental cultural activities, predict the probability of daily reading encounters. Among immigrant children we find the opposite: parental education matters while parents' cultural activities do not play a vital part. One possible explanation of this finding is that among native families, the effect of parental education might be mediated via cultural activities (see Klein & Biedinger, 2009). The measure of cultural activities employed in our study is however mainly related to the host country. Among immigrant parents', this measure might therefore not mediate the effect of parents'

education in a similar way. As Trienekens (2002) shows, classic measures of SES are less related to the cultural consumption patterns among immigrants. Unfortunately we do not have a measure that is specific for Turkish cultural activities in our data. Our results further show that some predictors specific to families with a migration background matter for daily parent–child reading. The age at migration of at least one parent and whether families use German as their main communication language (hypothesis 3) predict frequent reading activities with children.

Turning to the results on the effects of reading aloud in the native German sample as well as among Turkish immigrant families, they confirm that reading aloud daily has a positive effect on the vocabulary knowledge of children (hypothesis 4). However, effect sizes are rather small, medium at best. We find mixed evidence of persistent positive effects of reading aloud. When comparing families that read aloud daily with all other families that read to their children fewer times, the effects last over one year. However, when reducing the control group to families that read aloud several times a week, we do not find persistent effects for daily parent–child reading.

Comparing effect sizes of reading aloud in native German families and families with a Turkish migration background, the composition of the control group also matters. The effect among Turkish-origin families is slightly larger than among native German families when comparing children of parents who read to them daily to all other children. However, this is a direct consequence of the different composition of the reference group in the Turkish-origin and native German samples. Among native German families, the reference group consists mostly of parents who read aloud to their children several times a week. Almost no native German family reports reading aloud less than once a week. In contrast, the Turkish-origin reference group consists mostly of parents that read to their children rarely (Table A2). We took this into account in a further analysis by restricting the reference group to children of parents that read aloud several times a week. Among native German families, we still find a significant positive effect of reading aloud daily. Among families with a Turkish migration background, this conservative effect is smaller and not significant. This conservative test confirms hypothesis five.

Analyzing the effects of reading aloud to children of immigrants in more detail, we find that the positive effect is especially pronounced in families with German as their primary family language and among parents with good German language skills (hypothesis 6). In this group, the effect of daily parent–child reading is significantly higher than among native German children. However, these results are based on a relatively small number of observations and are rather explorative. As a consequence, they should be interpreted carefully. The results on the effects of reading aloud are in line with Bronfenbrenner's bio-ecological theory of human development (Bronfenbrenner, 1997). Reading aloud as one specific proximal process fosters the language skills of children. Moreover, the effectiveness of reading aloud varies with cultural aspects of the family. In our study we compare native German and Turkish-immigrant families. A very important aspect that

---

[7] The effect size in Turkish-origin families who use German as their primary language and in which parents have good German language skills can be calculated from the regression in Table 4. The effect size using the complete control group in wave 1 (model 1b) equals: $-1.54 + 1 \times (0.63) + 1 \times (3.92) = 3.01$.

matters for the effectiveness of reading aloud is the language usage and skills of immigrant parents. If they have high receiving country language skills, reading aloud is most effective to enhance children's host country language abilities.

Our study also has some limitations. First, the frequency of reading aloud is assessed by a direct question which might lead to answers that are biased due to social desirability. However, if parents report more frequent reading activities than actually took place, we tend to underestimate the effect of reading aloud rather than overestimating it. Another limitation of our study is the focus on children's expressive vocabulary. This is only one dimension of early language skills. It is argued that reading aloud fosters various aspects of the language development of children, e.g., vocabulary knowledge, listening comprehension, print concepts, and letter knowledge (Duursma et al., 2008; Leseman et al., 2007; Mol & Bus, 2011; Sénéchal et al., 1998; Zuckerman & Khandekar, 2010). Moreover, it is possible that reading aloud to children has a stronger effect on children's receptive vocabulary than on their expressive vocabulary. Due to data limitations, we could only focus on the expressive vocabulary knowledge of the children. Thus, reading aloud might impact the general language development of children more strongly than our study implies. However, concerning expressiv and receptive vocabulary, Mol and Bus (2011) find similar effects of reading aloud on both dimensions. Our analyses are further limited to the receiving country language skills of children. Reading aloud to children of immigrant families in their native language might also yield positive effects, e.g., on their general cognitive development and native language skills of children. Furthermore, it might foster bilingual language skills. These in turn have been shown to improve specific cognitive skills (Adesope, Lavin, Thompson, & Ungerleider, 2010; Bialystok, 2001). However, we focused on receiving country language skills of children because these are mostly rewarded in the educational system of the host country and a lack of receiving country language skills is regarded a major cause for ethnic educational inequalities. Finally, we measured the German language ability of the parents by parental self-assessment. An objective measurement via a standardized language ability test would have been more desirable. However, due to the rather time consuming interviews and tests with the children, it was not possible to include any further ability tests for the parents. This is a rather common problem in large scale surveys. Our measure is similar to measures commonly used in other surveys such as the Children of Immigrants Longitudinal Study (CILS) or the U.S. Census. For both surveys, self-reported language abilites have been shown to be highly correlated with objective language measures (Bleakley & Chin, 2008; Kominski, 1989; Portes & Hao, 2002).

The findings of our study support the view that reading aloud daily to children increases their language abilities in early childhood. Although the effects are rather small, children gain an advantage through parent–child reading activities. We also found that it is very common among native German families to read aloud daily. In contrast, only 17 percent of Turkish immigrant parents in our sample read to their children daily. Despite this fact, we found that in both groups of native and immigrant families, reading aloud daily positively affected vocabulary knowledge of children. Thus, it seems important to encourage families, especially immigrant families, to read aloud frequently to their children.

Furthermore, our analyses revealed that the positive effect of reading aloud on receiving country language skills was particularly pronounced in immigrant families with parents who possess good German language skills. This indicates the importance of a good integration of immigrant parents into the host society. Our analysis also revealed that highly integrated parents, using the language of the host country as family language, are also more likely to read to their children. Thus, providing immigrant parents with opportunities to learn the host country language supports the parents directly and may also have indirect positive effects on their children. This seems to be one way of reducing disadvantages of immigrants in the receiving country society due to intergenerationally transmitted host country language problems. Nevertheless, it is important to keep in mind that the positive effect of reading aloud in Turkish-origin families was too small to totally offset the language disadvantage of immigrant children compared to natives. Other aspects, such as the lower socioeconomic status and poorer endowment of cultural capital typically found in immigrant families, also lead to worse receiving country language skills of Turkish-origin children.

We believe it is necessary to continue examining the role of parents' host country language skills and the use of the receiving country's language as primary family language when analyzing the effects of reading aloud. Jäkel et al. (2011) find that in Germany most Turkish immigrant parents tend to read in German independent of the primary language they use in everyday family context. This supports our findings that it is probably not the primary family language that matters for the effectiveness of reading aloud but rather the language abilities of parents.

As we have seen, the positive effects of reading aloud did not necessarily persist over time. Among native German children, we find a decreasing effect of reading aloud one year after the first wave. However, this does not mean that reading aloud in later periods of the childhood is not valuable. It only shows that the direct effect of reading aloud at a certain age is most pronounced in the period immediately afterwards. In contrast to this, we found a slightly increasing positive effect of reading aloud over one year among children of Turkish-origin families. The analyses could not uncover reasons for this. One possible explanation is that children of Turkish-origin families receive only limited host country language input in their environments. Therefore, the specific language input through reading aloud was highly important for their development of German language skills. Thus, starting to read aloud to children of immigrants early in life seems to be an effective way to foster their language development. It appears that they can subsequently build on these early language skills. However, these explanations are rather speculative and future research with a focus on these

differences concerning the sustainability of the effects of reading aloud depending on migration background is needed.

Role of the funding source

The project is funded by the German Research Foundation (DFG), which had no involvement regarding the study design, the collection, analyses and interpretation of the data, the writing of the report, or the decision to submit this paper for publication.

Appendix A.

See Tables A1–A3.

Table A1
Descriptive statistics (means or proportions) by migration background.

	Native German families		Turkish-origin families		Sig.
	Mean	Std. dev.	Mean	Std. dev.	
Vocabulary (wave 1)	14.06	2.63	4.27	4.48	***
Vocabulary (wave 2)	18.28	2.78	10.46	5.35	***
Reading aloud daily	0.78	–	0.18	–	***
Low education	0.09	–	0.31	–	***
Intermediate education	0.38	–	0.57	–	***
High education	0.53	–	0.12	–	***
Income	3141.68	1527.88	2056.56	821.32	***
Income (missing)	0.08	–	0.17	–	***
Empl. primary caregiver (ref. no)	0.41	–	0.23	–	***
Number of books	297.45	447.19	60.78	178.36	***
Cultural capital	3.63	0.83	2.57	0.83	***
Engag. parenting practices	5.61	0.90	4.99	1.26	***
2nd gen.	0	–	0.53	–	–
2.5th gen.	0	–	0.33	–	–
3rd gen.	0	–	0.06	–	–
Intermarriage	0	–	0.08	–	–
Age at migration	0	–	12.29	10.59	–
Age at migration partner	0	–	13.70	10.96	–
Primary family language (ref. Turkish)	1	–	0.21	–	–
German language skills (ref. low)	1	–	0.47	–	–
Two-parent family (ref. single parent)	0.93	–	0.98	–	***
Sex of child (ref. male)	0.51	–	0.50	–	n.s.
Age of child (in months)	42.12	3.75	42.10	3.94	n.s.
Firstborn (ref. no)	0.45	–	0.35	–	**
Kindergarten (in months)	7.38	5.87	5.62	5.91	***
Number of children	1.99	0.83	2.35	1.08	***
Mother is primary caregiver (ref. no)	0.97	–	0.92	–	**
Chronic illness	0.11	–	0.09	–	n.s.
N	499		531		

Source: Project "Preschool Education and Educational Careers among Migrant Children", own calculations.
Note: All variables are taken from wave 1 (except "vocabulary wave 2").
** Mean comparison (*t*-test) by migration background significant with $p \leq 0.01$.
*** Mean comparison (*t*-test) by migration background significant with $p \leq 0.001$.

Table A2
Frequency of reading aloud by migration background (in percent).

Frequency	Native German families	Turkish-origin families
Never	0.40	17.51
Rarely	0.60	11.11
Once per month	0.20	3.77
Several times a month	1.60	4.90
Once a week	2.40	15.63
Several times a week	17.03	29.57
Daily	77.76	17.51

Source: Project "Preschool Education and Educational Careers among Migrant Children", own calculations.

Table A3
Mean standardized bias before and after matching.

Sample	Wave	Control group	Before matching	After matching
Native German	1	Complete	25.529	4.632
Native German	1	Conservative	19.629	4.372
Native German	2	Complete	25.088	4.816
Native German	2	Conservative	20.559	3.203
Turkish-origin	1	Complete	26.211	2.611
Turkish-origin	1	Conservative	16.406	3.786
Turkish-origin	2	Complete	27.340	4.211
Turkish-origin	2	Conservative	16.547	4.385

Source: Project "Preschool Education and Educational Careers among Migrant Children", own calculations.
Note: The "complete" control group consists of all children whom were read to less often than daily. The "conservative" control group consists only of children whom were read to several times a week.

References

Adesope, O. O., Lavin, T., Thompson, T., & Ungerleider, C. (2010). A systematic review and meta-analysis of the cognitive correlates of bilingualism. *Review of Educational Research*, *80*, 207–245.

Aiyagari, S. R., Greenwood, J., & Seshadri, A. (2002). Efficient investment in children. *Journal of Economic Theory*, *102*, 290–321.

Becker, G. S., & Tomes, N. (1986). Human capital and the rise and fall of families. *Journal of Labor Economics*, *4*, 1–39.

Becker, B. (2010). Who profits most from early parental investments? The effects of activities inside and outside the family on german and turkish children's language development. *Child Indicators Research*, *3*, 29–46.

Becker, B. (2011). Cognitive and language skills of turkish children in germany: A comparison of the second and third generation and mixed generational groups. *International Migration Review*, *45*, 426–459.

Bialystok, E. (2001). *Bilingualism in development: Language, literacy and cognition*. Port Chester, NY, USA: Cambridge University Press.

Bleakley, H., & Chin, A. (2008). What holds back the second generation? The intergenerational transmission of language human capital among immigrants. *Journal of Human Resources*, *43*, 267–298.

Bronfenbrenner, U. (1976). Experimental ecology of education. *Teachers College Record*, *78*, 157–204.

Bronfenbrenner, U. (1977). Toward an experimental ecology of human-development. *American Psychologist*, *32*, 513–531.

Bronfenbrenner, U. (1986). Ecology of the family as a context for human-development – Research perspectives. *Developmental Psychology*, *22*, 723–742.

Bronfenbrenner, U. (1997). Ecological models of human development. In M. Gauvain, & M. Cole (Eds.), *Readings on the development of children* (second ed., pp. 37–43). NY: Freeman.

Burgess, S. R., Hecht, S. A., & Lonigan, C. J. (2002). Relations of the home literacy environment (HLE) to the development of reading-related abilities: A one-year longitudinal study. *Reading Research Quarterly*, *37*, 408–426.

Bus, A. G., Van Ijzendoorn, M. H., & Pellegrini, A. D. (1995). Joint book reading makes for success in learning to read – A metaanalysis on intergenerational transmission of literacy. *Review of Educational Research*, *65*, 1–21.

Caliendo, M., & Kopeinig, S. (2008). Some practical guidance for the implementation of propensity score matching. *Journal of Economic Surveys*, *22*, 31–72.

Caspar, U., & Leyendecker, B. (2011). Deutsch als Zweitsprache, Die Sprachentwicklung türkischstämmiger Vorschulkinder in Deutschland. *Zeitschrift für Entwicklungspsychologie und Pädagogische Psychologie*, *43*, 118–132.

Conger, R. D., Conger, K. J., & Martin, M. J. (2010). Socioeconomic status, family processes, and individual development. *Journal of Marriage and the Family*, *72*, 685–704.

Conger, R. D., & Dogan, S. J. (2007). Social class and socialization in families. In J. E. Grusec, & P. D. Hastings (Eds.), *Handbook of socialization – Theory and research* (pp. 433–460). New York, NY: The Guilford Press.

Craig, L. (2006). Parental education, time in paid work and time with children: An Australian time-diary analysis. *British Journal of Sociology*, *57*, 553–575.

Crosnoe, R., Leventhal, T., Wirth, R. J., Pierce, K. M., & Pianta, R. C. (2010). Family socioeconomic status and consistent environmental stimulation in early childhood. *Child Development*, *81*, 972–987.

Debaryshe, B. D. (1995). Maternal belief systems – Linchpin in the home reading process. *Journal of Applied Developmental Psychology*, *16*, 1–20.

Duursma, E., Augustyn, M., & Zuckerman, B. (2008). Reading aloud to children: The evidence. *Archives of Disease in Childhood*, *93*, 554–557.

Ehmke, T., & Siegle, T. (2005). ISEI, ISCED, HOMEPOS, ESCS – Indikatoren der sozialen Herkunft bei der Quantifizierung von sozialen Disparitäten. *Zeitschrift fur Erziehungswissenschaft*, *8*, 521–539.

Ermisch, J. (2008). Origins of social immobility and inequality: Parenting and early child development. *National Institute Economic Review*, *205*, 62–71.

Esping-Andersen, G., & Bonke, J. (2007). *Parental investments in children: How bargaining and educational homogamy affect time allocation. DemoSoc working paper* (Vol. 20) Barcelona: Universitat Pompeu Fabra.

Evans, M. A., Shaw, D., & Bell, M. (2000). Home literacy activities and their influence on early literacy skills. *Canadian Journal of Experimental Psychology – Revue Canadienne de Psychologie Experimentale*, *54*, 65–75.

Forget-Dubois, N., Dionne, G., Lemelin, J. P., Perusse, D., Tremblay, R. E., & Boivin, M. (2009). Early child language mediates the relation between home environment and school readiness. *Child Development*, *80*, 736–749.

Gangl, M. (2010a). Causal inference in sociological research. *Annual Review of Sociology*, *36*, 21–47.

Gangl, M. (2010b). Nichtparametrische Schätzung kausaler Effekte mittels Matchingverfahren. In C. Wolf, & H. Best (Eds.), *Handbuch der sozialwissenschaftlichen Datenanalyse*. Wiesbaden: VS Verlag für Sozialwissenschaften.

Gangl, M., & DiPrete, T. A. (2006). Kausalanalyse durch Matchingverfahren. *Kölner Zeitschrift fur Soziologie und Sozialpsychologie*, *56*, 396–420.

Heath, A., & Brinbaum, Y. (2007). Explaining ethnic inequalities in educational attainment. *Ethnicities*, *7*, 291–305.

Heckman, J. J. (2006). Skill formation and the economics of investing in disadvantaged children. *Science*, *312*, 1900–1902.

Holland, P. W. (1986). Statistics and causal inference. *Journal of the American Statistical Association*, *81*, 945–960.

Hood, M., Conlon, E., & Andrews, G. (2008). Preschool home literacy practices and children's literacy development: A longitudinal analysis. *Journal of Educational Psychology*, *100*, 252–271.

Jäkel, J., Schölmerich, A., Kassis, W., & Leyendecker, B. (2011). Mothers' and fathers' bookreading predicts pre-schoolers' development in Turkish immigrant and German families. *International Journal of Developmental Science*, *5*, 1–13.

Karrass, J., VanDeventer, M. C., & Braungart-Rieker, J. M. (2003). Predicting shared parent–child book reading in infancy. *Journal of Family Psychology*, *17*, 134–146.

Kim, Y. S. (2009). The relationship between home literacy practices and developmental trajectories of emergent literacy and conventional literacy skills for Korean children. *Reading and Writing*, *22*, 57–84.

Kitterod, R. H. (2002). Mothers' housework and childcare: Growing similarities or stable inequalities? *Acta Sociologica*, *45*, 127–149.

Klein, O., & Biedinger, N. (2009). *Determinanten elterlicher Aktivitäten mit Voschulkindern. Der Einfluss von Bildungsaspirationen und kulturellem Kapital. Working Paper* (Vol. 121) Mannheim: Mannheim Centre for European Social Research.

Kloosterman, R., Notten, N., Tolsma, J., & Kraaykamp, G. (2011). The effects of parental reading socialization and early school involvement on children's academic performance: A panel study of primary school pupils in the Netherlands. *European Sociological Review*, *27*, 291–306.

Kominski, R. (1989). How good is How well? An examination of the census English-speaking ability question. In *1989 Annual Meeting of the American Statistical Association* Washington, DC.

Kristen, C., Edele, A., Kalter, F., Kogan, I., Schulz, B., Stanat, P., et al. (2011). The education of migrants and their children across the life course. *Zeitschrift fur Erziehungswissenschaft*, *14*, 121–137.

Leseman, P. P. M., Scheele, A. F., Mayo, A. Y., & Messer, M. H. (2007). Home literacy as a special language environment to prepare children for school. *Zeitschrift fur Erziehungswissenschaft*, *10*, 334–355.

Leseman, P. P. M., & van den Boom, D. C. (1999). Effects of quantity and quality of home proximal processes on Dutch, Surinamese-Dutch and Turkish-Dutch pre-schoolers' cognitive development. *Infant and Child Development*, *8*, 19–38.

Leuven, E., & Sianesi, B. (2003). PSMATCH2: Stata module to perform full Mahalanobis and propensity score matching, common support graphing, and covariate imbalance testing. Version 4.0.3 01oct2010. In *Boston College Department of Economics, Statistical Software Components*.

Leyendecker, B., Jäkel, J., Kademoglu, S. O., & Yagmurlu, B. (2010). Parenting practices and pre-schoolers' cognitive skills in Turkish immigrant and German families. *Early Child Development and Care*, 1–16, iFirst Article.

Manolitsis, G., Georgiou, G. K., & Tziraki, N. (2013). Examining the effects of home literacy and numeracy environment on early reading and math acquisition. *Early Childhood Research Quarterly*, *28*, 692–703.

Melchers, P., & Preuß, U. (2001). *Kaufman assessment battery for children: K-ABC, deutschsprachige Fassung*. Leiden: PITS.

Melhuish, E. C., Phan, M. B., Sylva, K., Sammons, P., Siraj-Blatchford, I., & Taggart, B. (2008). Effects of the home learning environment and preschool center experience upon literacy and numeracy development in early primary school. *Journal of Social Issues*, *64*, 95–114.

Mistry, R. S., Biesanz, J. C., Chien, N., Howes, C., & Benner, A. D. (2008). Socioeconomic status, parental investments, and the cognitive and behavioral outcomes of low-income children from immigrant and native households. *Early Childhood Research Quarterly*, *23*, 193–212.

Mol, S. E., & Bus, A. G. (2011). To read or not to read: A meta-analysis of print exposure from infancy to early adulthood. *Psychological Bulletin*, 1–30.

Morgan, S. L., & Harding, D. J. (2006). Matching estimators of causal effects – Prospects and pitfalls in theory and practice. *Sociological Methods & Research*, *35*, 3–60.

Niklas, F., Schmiedeler, S., Prostler, N., & Schneider, W. (2011). The impact of background of migration, kindergarten attendance, and the composition of the kindergarten group on linguistic performance at preschool age. *Zeitschrift Fur Padagogische Psychologie*, *25*, 115–130.

Niklas, F., & Schneider, W. (2010). Der Zusammenhang von familiärer Lernumwelt mit schulrelevanten Kompetenzen im Vorschulalter. *Zeitschrift für Soziologie der Erziehung und Sozialisation*, *30*, 149–165.

Portes, A., & Hao, L. X. (2002). The price of uniformity: Language, family and personality adjustment in the immigrant second generation. *Ethnic and Racial Studies*, *25*, 889–912.

Raikes, H., Pan, B. A., Luze, G., Tamis-LeMonda, C. S., Brooks-Gunn, J., Constantine, J., et al. (2006). Mother–child bookreading in low-income families: Correlates and outcomes during the first three years of life. *Child Development*, *77*, 924–953.

Raviv, T., Kessenich, M., & Morrison, F. J. (2004). A mediational model of the association between socioeconomic status and three-year-old language abilities: The role of parenting factors. *Early Childhood Research Quarterly*, *19*, 528–547.

Rosenbaum, P. R., & Rubin, D. B. (1983). The central role of the propensity score in observational studies for causal effects. *Biometrika*, *70*, 41–55.

Rubin, D. B. (1974). Estimating causal effects of treatments in randomized and nonrandomized studies. *Journal of Educational Psychology*, *66*, 688–701.

Rubin, D. B. (1978). Bayesian-inference for causal effects – Role of randomization. *Annals of Statistics*, *6*, 34–58.

Rush, K. L. (1999). Caregiver–child interactions and early literacy development of preschool children from low-income environments. *Topics in Early Childhood Special Education*, *19*, 3–14.

Scarborough, H. S., & Dobrich, W. (1994). On the efficacy of reading to preschoolers. *Developmental Review*, *14*, 245–302.

Scheele, A. F., Leseman, P. P. M., & Mayo, A. Y. (2010). The home language environment of monolingual and bilingual children and their language proficiency. *Applied Psycholinguistics*, *31*, 117–140.

Sénéchal, M. (2006). Testing the home literacy model: Parent involvement in kindergarten is differentially related to Grade 4 reading comprehension, fluency, spelling, and reading for pleasure. *Scientific Studies of Reading*, *10*, 59–87.

Sénéchal, M., & LeFevre, J. A. (2002). Parental involvement in the development of children's reading skill: A five-year longitudinal study. *Child Development*, *73*, 445–460.

Sénéchal, M., LeFevre, J. A., Thomas, E. M., & Daley, K. E. (1998). Differential effects of home literacy experiences on the development of oral and written language. *Reading Research Quarterly*, *33*, 96–116.

Shapiro, J., Anderson, J., & Anderson, A. (1997). Diversity in parental storybook reading. *Early Child Development and Care*, *127*, 47–58.

Sonnenschein, S., & Munsterman, K. (2002). The influence of home-based reading interactions on 5-year-olds' reading motivations and early literacy development. *Early Childhood Research Quarterly*, *17*, 318–337.

Stanat, P., & Christensen, G. (2006). Where immigrant students succeed – A comparative review of performance and engagement in PISA 2003. In OECD (Ed.), *Programme for international student assessment*. Paris: OECD.

Statistisches Bundesamt. (2012). Bevölkerung und Erwerbstätigkeit. In S. Bundesamt (Ed.), *DESTATIS – Wissen. nutzen* (Vol. 2.2). Wiesbaden: Statistisches Bundesamt.

Trienekens, S. (2002). 'Colourful' distinction: The role of ethnicity and ethnic orientation in cultural consumption. *Poetics*, *30*, 281–298.

Wachs, T. D., & Chan, A. (1986). Specificity of environmental action, as seen in environmental correlates of infants communication performance. *Child Development*, *57*, 1464–1474.

Winship, C., & Morgan, S. L. (1999). The estimation of causal effects from observational data. *Annual Review of Sociology*, *25*, 659–706.

Wood, C. (2002). Parent–child pre-school activities can affect the development of literacy skills. *Journal of Research in Reading*, *25*, 241–258.

Yarosz, D. J., & Barnett, W. S. (2001). Who reads to young children? Identifying predictors of family reading activities. *Reading Psychology*, *22*, 67–81.

Yeung, W. J., Linver, M. R., & Brooks-Gunn, J. (2002). How money matters for young children's development: Parental investment and family processes. *Child Development*, *73*, 1861–1879.

Yeung, W. J., Sandberg, J. F., Davis-Kean, P. E., & Hofferth, S. L. (2001). Children's time with fathers in intact families. *Journal of Marriage and the Family*, *63*, 136–154.

Zick, C. D., Bryant, W. K., & Osterbacka, E. (2001). Mothers' employment, parental involvement, and the implications for intermediate child outcomes. *Social Science Research*, *30*, 25–49.

Zuckerman, B., & Khandekar, A. (2010). Reach out and read: Evidence based approach to promoting early child development. *Current Opinion in Pediatrics*, *22*, 1–6.